

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-23 (Cancelled).

Claim 24 (Previously Presented): An analyzer, comprising:  
a monochromator that receives X-ray radiation emitted by a sample and reflects and refracts the X-ray radiation to create diffraction lines; and

a detector that receives the diffraction lines and converts the diffraction lines into an electrical signal;

wherein:

the monochromator comprises a single-crystal lithium fluoride doped with at least 0.018 mol per kg of a divalent positive ion M present in a fluorinated state; and

the analyzer is configured to perform elemental analysis of the sample.

Claim 25 (Previously Presented): The analyzer as claimed in claim 24, wherein the ionic radius of the divalent ion M ranges from 55 to 80 picometers.

Claim 26 (Previously Presented): The analyzer as claimed in claim 25, wherein M is present in the fluoride in an amount of at least 0.02 mol per kg.

Claim 27 (Previously Presented): The analyzer as claimed in claim 26, wherein M is present in the fluoride in an amount of at least 0.023 mol per kg.

Claim 28 (Previously Presented): The analyzer as claimed in claim 27, wherein M is present in the fluoride in an amount of at least 0.025 mol per kg.

Claim 29 (Previously Presented): The analyzer as claimed in claim 24, wherein M is present in the fluoride in an amount of at most 0.082 mol per kg.

Claim 30 (Previously Presented): The analyzer as claimed in claim 29, wherein M is present in the fluoride in an amount of at most 0.045 mol per kg.

Claim 31 (Previously Presented): The analyzer as claimed in claim 24, wherein M is  $\text{Mg}^{2+}$ .

Claim 32 (Previously Presented): The analyzer as claimed in claim 24, wherein M is  $\text{Co}^{2+}$ .

Claim 33 (Previously Presented): The analyzer as claimed in claim 24, wherein M is  $\text{Zn}^{2+}$ .

Claim 34 (Previously Presented): The analyzer as claimed in claim 24, wherein M is a mixture of at least two ions chosen from  $\text{Mg}^{2+}$ ,  $\text{Zn}^{2+}$  and  $\text{Co}^{2+}$ .

Claim 35 (Previously Presented): The analyzer as claimed in claim 24, wherein the fluoride is present in the form of a cube or a parallelepiped shape.

Claim 36 (Previously Presented): The analyzer as claimed in claim 24, wherein the volume of the fluoride ranges from  $2.5 \times 10^{-3} \text{ cm}^3$  to  $30 \text{ cm}^3$ .

Claim 37 (Previously Presented): The analyzer as claimed in claim 36, wherein the volume of the fluoride ranges from 0.01 to 20 cm<sup>3</sup>.

Claim 38 (Previously Presented): The analyzer as claimed in claim 24, wherein the fluoride has a cleaved surface.

Claim 39 (Previously Presented): The analyzer as claimed in claim 24, wherein the fluoride has a surface that is ground and then treated in an acid medium or polished,

Claim 40 (Previously Presented): The analyzer as claimed in claim 24, wherein the detector comprises at least one scintillator consisting of a rare-earth halide.

Claim 41 (Previously Presented): The analyzer as claimed in claim 40, wherein the rare-earth halide is CeCl<sub>3</sub>-doped LaCl<sub>3</sub> or CeBr<sub>3</sub>-doped LaBr<sub>3</sub>.

Claim 42 (Previously Presented): A method, comprising:  
analyzing an element of a specimen with the analyzer as claimed in claim 24;  
wherein:  
the analyzer comprises a detector consisting of a scintillator; and  
the scintillator is set on a line having a wavelength of less than 3 Å.

Claim 43 (Previously Presented): The method as claimed in claim 42, wherein the scintillator is set on a line having a wavelength of less than 2 Å.

Claim 44 (Previously Presented): The method as claimed in claim 43, wherein the scintillator is set on a line having a wavelength of less than 1.5 Å.

Claims 45-58 (Cancelled).

Claim 59 (Previously Presented): A process for performing elemental analysis of a sample, comprising:

exciting the sample with a primary X-ray beam so that the sample emits a second X-ray beam by fluorescence;

reflecting and refracting the second X-ray beam into diffraction lines with a monochromator; and

detecting the diffraction lines and converting the diffraction lines into an electrical signal with a detector;

wherein the monochromator comprises a single-crystal lithium fluoride doped with at least 0.018 mol per kg of a divalent positive ion M present in a fluorinated state.

Claim 60 (Previously Presented): A single-crystal lithium fluoride doped with 0.023 to 0.082 mol per kg of a divalent positive ion M present in the fluorinated state, wherein essentially all M ions are in the single-crystal cation lattice.

Claim 61 (Previously Presented): The fluoride as claimed in claim 60, wherein the ionic radius of the divalent ion M ranges from 55 to 80 picometers.

Claim 62 (Previously Presented): The fluoride as claimed in claim 61, wherein M is present in an amount of at least 0.025 mol per kg.

Claim 63 (Previously Presented): The fluoride as claimed in claim 62, wherein M is present in an amount of at most 0.045 mol per kg.

Claim 64 (Previously Presented): The fluoride as claimed in claim 60, wherein M is  $\text{Mg}^{2+}$ .

Claim 65 (Previously Presented): The fluoride as claimed in claim 60, wherein M is  $\text{Co}^{2+}$ .

Claim 66 (Previously Presented): The fluoride as claimed in claim 60, wherein M is  $\text{Zn}^{2+}$ .

Claim 67 (Previously Presented): The fluoride as claimed in claim 60, wherein M is a mixture of at least two ions chosen from  $\text{Mg}^{2+}$ ,  $\text{Zn}^{2+}$  and  $\text{Co}^{2+}$ .

Claim 68 (Previously Presented): The fluoride as claimed in claim 60, wherein said fluoride is present in the form of a cube or a parallelepiped shape.

Claim 69 (Previously Presented): The fluoride as claimed in claim 60, wherein the volume of said fluoride ranges from  $2.5 \times 10^{-3} \text{ cm}^3$  to  $30 \text{ cm}^3$ .

Claim 70 (Previously Presented): The fluoride as claimed in claim 69, wherein the volume ranges from 0.01 to  $20 \text{ cm}^3$ .

Claim 71 (Previously Presented): The fluoride as claimed in claim 60, wherein said fluoride has a cleaved surface.

Claim 72 (Previously Presented): The fluoride as claimed in claim 60, wherein said fluoride has a surface that is ground and then treated in an acid medium or polished,

Claim 73 (Previously Presented): A method for preparing a monochromator, comprising utilizing the fluoride of claim 60.